

## **REMARKS**

In response to the Office Action dated January 18, 2006, claims 36, 40, and 45-53 have been amended. No new matter has been added. Reexamination and reconsideration of the claims as requested is respectfully requested.

On page 3 of the Office Action, claims 45-53 are rejected under 35 U.S.C. § 112 second paragraph as being indefinite for failing to particularly point out and distinctly claim the subject matter which is regarded as the invention. The Applicants respectfully traverse this rejection, but have amended the application to overcome the objections. The claims have been amended in view of the Examiner's comments. It is believed that all claims comply with 35 U.S.C. § 112.

Applicants respectfully request the Examiner withdraw the rejection of claims 45-53 under 35 U.S.C. § 112.

On page 3 of the Office Action, claims 36, 40-43, 45, 46, and 49-51 are rejected under 35 U.S.C. §102 (b) as being anticipated by, or in the alternative, under 35 U.S.C. §103(a) as obvious over Shibuta (U.S. 5,853,877). The Applicants respectfully traverse this rejection, but have amended the application to overcome the objections.

On page 5 of the Office Action, claim 38 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Shibuta. Further, claims 37, 39, 44, 47, 48, 52, and 53 are rejected as being unpatentable over Shibuta as applied to claims 36, 40-43, 45, 46, and 49-51, and further in view of Stephan, et al. ("Doping Graphitic and Carbon Nanotube Structures with Boron and Nitrogen"). The Applicant respectfully traverses this rejection, but have amended the application to overcome the objections.

To anticipate a claim, a reference must teach every element of the claim. "A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). "The identical invention must be shown in as complete detail as is contained in the ... claim." *Richardson v. Suzuki Motor Co.*, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989). Therefore, all claim elements, and their features, must be found in a cited reference to maintain a rejection based on 35 U.S.C. § 102.

Three criteria must be met to establish a prima facie case of obviousness. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference. Second, there must be a reasonable expectation of success. Finally, the prior art reference, or combination of references, must teach or suggest all the claim limitations. MPEP § 2142.

The invention, as claimed in independent Claims 36 and 40, comprises, *inter alia*:  
**a substrate bearing chemically reactive groups**; and  
at least one multiwall carbon nanotube, the at least one multiwall carbon nanotube having:

...

wherein, due to the substantial oxidation of the outer wall, the at least one multiwall **carbon nanotube is bound covalently to the chemically reactive groups** of the substrate. (emphasis added)

On pages 4-5 of the Office Action, the Examiner states:

Shibuta does not teach that covalent bonding of the nanotube to the substrate occurs due to the oxidation of the nanotube surface. However, it is expected that this covalent bonding occur, because no difference is seen between the process of Shibuta and that of the applicant. The oxidized nanotubes of Shibuta are dispersed in water and coated onto a glass substrate in example 1. This same process is taught by the applicant to result in covalent bonding of the nanotubes to the substrate because substrates based on silicon, for example glass, are known to bear hydroxyl groups which will bond with the carboxyl groups on the surface of the nanotubes. Where, as here, the claimed and prior art products are identical or substantially identical, or are produced by identical or substantially identical processes, the burden of proof is shifted to the applicant to prove that the prior art products do not necessarily or inherently possess the characteristics of his claimed product. See *In re Best*, 195 USPQ 430.

Col. 6, lines 26-33, of Shibuta states:

An electrically conductive transparent carbon microfibers aggregation film on the substrate is formed.... The type of a substrate can be **generally transparent materials** such as the film or the sheet of glass or transparent plastic (e.g. polyesters, polycarbonate, acrylic resins, etc.) and moreover occasionally untransparent materials suitable for applications.

Hollow carbon microfibers treated with the present method of **self-cohesiveness** and combine with one another at the contact point between microfibers after drying.... Therefore, according to the present invention, a perfect carbon transparent aggregation film comprising substantially hollow carbon microfibers alone can be obtained.....

(Emphasis added)

Nowhere does the very detailed description in Shibuta disclose or suggest the binding of the microfibers to the substrate, coating the substrate with chemically reactive groups, or using a substrate having chemically reactive groups. The only selection criterion in Shibuta for the substrate is that it is a transparent material.

On page 2 of the Office Action, the Examiner stated in the Response to Arguments, that:

“ . . . for example glass, are known to bear hydroxyl groups which will bond

with the carboxyl groups on the surface of the nanotubes.”

This is the case only if the glass has previously been coated or brought into contact with a material containing hydroxyl groups. There is no disclosure or suggestion of such in Shibuta.

Shibuta explicitly states that the microfibers have self-cohesiveness and therefore combine with one another. If taken literally, if the microfibers have self-cohesiveness, then there would be no need in Shibuta to have a substrate with chemically reactive groups for binding to the microfibers.

Furthermore, the disclosure in Shibuta gives the impression that the microfibers aggregation film formed on the substrate, is or can be removed from the substrate. Nowhere does Shibuta mention a combination of the microfibers aggregation film and the substrate.

As discussed in MPEP §2112, a limitation recited in a claim that is not expressly or implicitly disclosed in a prior art reference is inherently disclosed therein if, and only if, the “missing” limitation is necessarily present in the prior art, and that it would be so recognized by persons of ordinary skill. The principles of inherency require that the inherency be absolute, and not probabilistic.

Applicants respectfully assert that there is no disclosure or suggestion in Shibuta that the microfibers will absolutely necessarily bind to the substrate or to chemically reactive groups of the substrate, and that this would be so recognized by persons of ordinary skill in the art.

Therefore, the invention as recited in claims 36 and 40 of the instant application is believed not to be anticipated, nor rendered obvious, by Shibuta.

Applicant respectfully requests the Examiner withdraw the rejection of independent claims 36 and 40 under U.S.C. §102 (b) as being anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Shibuta.

Dependent claim 38, dependent from claim 36, and dependent claims 41-43, 45-46 and 49-51, dependent from claim 40, were also rejected as being unpatentable over Shibuta. While the Applicants do not acquiesce to the particular rejections to these dependent claims, it is asserted that these rejections are moot in view of the remarks made in connection with independent claims 36 and 40. These dependent claims include all of the features of the base claim and any intervening claims, and recite additional features which further distinguish these claims from the proposed combination of references.

Therefore, dependent claims 38, 41-43, 45-46 and 49-51 are also in condition for allowance. Applicants respectfully request the withdrawal of the rejection of claims 38, 41-43, 45-46 and 49-51 under 35 U.S.C. § 103(a) as being unpatentable over Shibuta.

Turning now to the rejection of claims 37, 39, 44, 47-48 and 52-53 under 35 U.S.C. 103(a) over Shibuta in view of Stephan. Stephan fails, *inter alia*, to cure the deficiencies of Shibuta. Specifically, Stephan fails to teach or suggest the binding of microfibers to the substrate, coating the substrate with chemically reactive groups, or using a substrate having a substrate having chemically reactive groups. As a result, neither Shibuta, nor Stephan, nor the combination thereof, render independent claims 36 and 40 obvious.

Dependent claims 37 and 39, dependent from claim 36, and dependent claims 44, 47-48, and 52-53, dependent from claim 40, are rejected as being unpatentable

over Shibuta in view of Stephan. While the Applicants do not acquiesce to the particular rejections to these dependent claims, it is asserted that these rejections are moot in view of the remarks made in connection with independent claims 36 and 40. These dependent claims include all of the features of the base claim and any intervening claims, and recite additional features which further distinguish these claims from the proposed combination of references.

Therefore, dependent claims 37, 39, 44, 47-48 and 52-53 are also in condition for allowance. Applicants respectfully request the withdrawal of the rejection of claims 38, 37, 39, 44, 47-48 and 52-53 under 35 U.S.C. § 103(a) as being unpatentable over Shibuta in view of Stephan.

### **CONCLUSION**

In view of the amendments and reasons provided above, it is believed that all pending claims are in condition for allowance. The amendments clarify the patentable invention without adding new subject matter. Applicant respectfully requests favorable reconsideration and early allowance of all pending claims.


If a telephone conference would be helpful in resolving any issues concerning this communication, please contact Applicant's attorney of record, Jeffrey R. Stone at 952 253-4130.

Respectfully submitted,

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By:

  
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